DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The pressure distribution over the northeast Pacific was close to normal up to about the 24th with the continental extension of the North Pacific statistical anticyclone rather more intense than usual over the Great Basin region. During the last week of the month this anticyclone gave way both over the ocean and the continent and several much-needed rainstorms prevailed over central and northern California. On p. 2 of this REVIEW MR. T. R. Reed, of the San Francisco Weather Bureau Office, gives the mean pressure distribution over the Pacific leading up to the rains above mentioned.—*A. J. H.*

CYCLONES AND ANTICYCLONES

By W. P. DAY

While abnormally low air pressures were being recorded over the North Pacific in the vicinity of the Aleutian Islands and in northern and western Alaska during January, an apparently compensating excess of pressure occurred along the Pacific coast south of Alaska. High pressure was persistent over the Pacific States and the Plateau region, except near the middle of the month and again near the end. With this general distribution of pressure, nearly half of the LOWS plotted were of the Alberta type, 10 out of a total of 22. However, four LOWS which developed over the south and southwest were more important as storms, the Alberta type generally giving rather light precipitation.

The six HIGHS from the Canadian interior were of moderate proportions and most of them moved rapidly. Thirteen HIGHS were plotted, which is about normal.

FREE-AIR SUMMARY

By V. E. JAKL

It will be noted at once from the departures on Table 1 that free-air temperatures were lower than normal over the southern stations and higher than normal over the northern. This is in agreement with the distribution of departures for the surface over corresponding portions of the country as shown by Chart III, this Review. Ellendale and Drexel were above normal, Broken Arrow, Due West, and Groesbeck below normal, and Royal Center approximately normal. The departures were largest at Ellendale, where the excess over normal was especially evident in the lower levels, diminishing thence upward. Over Drexel the departures also diminished with altitude, while elsewhere there was a tendency for a perceptible increase in the deficiency in temperature with altitude, indicating a stronger average lapse rate at all stations than normal.

The resultant winds, as given in Table 2, apparently show no decided relation to the departures in temperature, that is, the southern stations do not show an excess—nor the northern stations a diminution—of northerly component as compared with the normal, such as might be expected from the temperature record. This is plainly evident in the wind record for Ellendale, where the resultants are almost identical with the normal. For example, in the record of the 28th–29th (see following table) it will be noted that the greatest change to warmer on the 29th from the relative low temperatures on the 28th occurred at those levels where the wind direction changed from southerly to one having a northerly component. This change was typical of a condition that repeated itself a number of times during the month at Ellendale, in which the southerly winds in the rear of a cold HIGH were replaced by westerly to northwesterly winds in the south and southwest portion of a relatively warm LOW approaching rapidly from the northwest or west-northwest. The pronounced character of this change at Ellendale was, moreover, emphasized by the fact that the minimum surface temperature on the 28th, −26.7°, was the lowest of the month, and the maximum surface temperature on the 29th, 10°, lacked only about a degree of being the highest of the month. It will be seen by the record of temperature at 750 meters on the 29th that it was necessary for insolation to warm the lowest layers only to the extent of heating the surface to the potential temperature that prevailed 300 meters higher up, in order to reach a maximum surface temperature even greater than that actually observed.

Altitude m. s. l.	Jan. 28		Jan. 29	
	Temperature	Wind direction	Temperature	Wind direction
Meters	°C.		°C.	
444 (surface)	−22.5	S.	−10.0	SSW.
500	−22.3	S.	−6.8	SW.
750	−21.8	SSW.	7.8	NW.
1,000	−19.7	SSW.	6.1	NW.
1,500	−12.7	SW.	2.6	WNW.
2,000	−11.2	WSW.	1.3	W.
2,500	−8.6	W.	−1.0	W.
3,000	−10.2	NW.		

Wind directions aloft were on the whole principally west, except that over the northern plains States they were northwest at all altitudes. Also over the northeastern portion of the country there was a well defined tendency for the winds to become northwesterly at altitudes of 3,000 meters and above. Velocities averaged higher than normal, a fact apparently associated with the rapid movement of HIGHS and LOWS that featured the month. Strong winds aloft were particularly in evidence from the 26th to 28th, when winds of 30 to 40 meters per second from west to northwest were recorded at various altitudes at Broken Arrow, Drexel, Due West, Ellendale, Groesbeck, Ithaca, Lansing, Royal Center, and Washington. The tendency to an unusually strong drift in a general west to east direction during the month was also evidenced by the rare occurrence of winds of even moderate depth having an easterly component. The only instance of easterly winds to any comparatively high altitude occurring over an extended area was observed on the 8th, when, in connection with a HIGH that overlay the lower Lake region and New England States, winds having a decided component from the east to depths ranging from 3,000 to 4,000 meters were observed at Ithaca, Lansing, and Royal Center.

The cold wave condition that overswept middle sections of the country on the 11th–12th, is of interest from the standpoint of its progressive effect on upper-air temperatures. This is well shown by the record given in the following table, all the stations affected having been able to get observations to 3,000 meters or more while under the influence of the HIGH concerned. By comparing the two stations most widely separated in latitude, Ellendale and Groesbeck, it will be noted that the HIGH moderated much faster in the lower than in the upper levels as it passed southward.

Altitude, m. s. l.	Ellendale (444 meters) Jan. 11		Drexel (396 meters) Jan. 11		Broken Arrow (233 meters) Jan. 12		Royal Center (225 meters) Jan. 12		Groesbeck (141 meters) Jan. 12	
	Temperature	Wind direction	Temperature	Wind direction	Temperature	Wind direction	Temperature	Wind direction	Temperature	Wind direction
Meters	° *C.*		° *C.*		° *C.*		° *C.*		° *C.*	
Surface	−20.7	NW	−14.0	NNW	−6.0	SW	−19.0	W	−0.5	N.
500	−21.0	NW	−14.9	NNW	−7.5	SW	−17.9	WNW	−1.0	NNE.
1,000	−19.3	N.	−13.5	N.	−4.5	W.	−17.8	W.	−0.2	NNE.
1,500	−12.4	NNE.	−11.3	N.	−6.3	WNW	−17.9	SW.	−1.3	NNW.
2,000	−14.3	NNE.	−11.7	NNW.	−8.1	WNW	−14.1	WNW	−3.0	NNW.
2,500	−17.0	NNE.	−14.2	NNW.	−7.7	WNW	−15.8	NW.	−5.5	WNW.
3,000	−20.0	N.	−16.7	NNW.	−10.2	WNW	−17.8	NW.	−8.8	WNW.
3,500	−21.5	N.			−12.6	WNW	−20.0	WNW	−12.6	WNW.

A typical winter free-air record accompanying precipitation is that shown by the observation at Royal Center on the 17th, during which rain began and continued until the next day. Most of the precipitation, however, fell after the surface wind changed to northeast, attending the approach of the LOW center from the southwest.

Altitude, m. s. l.	Temperature	Relative humidity	Wind	
			Direction	Velocity
Meters	° *C.*	%		*m. p. s.*
225 (surface)	4.1	81	SSW	1.3
464	6.8	68	WSW	12.4
559	6.3	79	W	10.5
752	6.5	100	W	8.5
1,366	4.4	93	WSW	12.6
1,888	0.1	100	WSW	16.1
2,293	−1.7	83	WSW	17.7
2,768	−6.3	100	WSW	17.4
3,333	−7.8	100	WSW	

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during January, 1926*

TEMPERATURE (°C.)

Altitude m. s. l.	Broken Arrow, Okla. (233 *meters*)		Drexel, Nebr. (396 *meters*)		Due West, S. C. (217 *meters*)		Ellendale, N. Dak. (444 *meters*)		Groesbeck, Tex. (141 *meters*)		Royal Center, Ind. (225 *meters*)	
	Mean	Departure from 8-yr. mean	Mean	Departure from 11-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 9-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 8-yr. mean
Meters												
Surface	2.4	−1.1	−3.6	+2.4	4.6	−1.5	−7.7	+3.1	6.7	−1.0	−3.6	+0.4
250	2.4	−1.1			4.5	−1.5			6.4	−1.1	−3.6	+0.6
500	2.2	−0.9	−4.1	+2.0	4.1	−1.3	−7.7	+3.0	5.8	−1.3	−4.7	+0.4
750	1.8	−1.1	−3.6	+2.0	3.2	−1.7	−6.9	+3.1	5.5	−1.5	−4.6	+0.7
1,000	1.4	−1.4	−2.4	+2.2	2.1	−2.2	−5.8	+2.7	5.1	−2.0	−5.0	+0.3
1,250	1.0	−1.7	−2.1	+1.9	1.4	−2.3	−5.3	+2.3	4.1	−2.7	−5.3	+0.1
1,500	0.7	−1.7	−2.7	+1.4	0.8	−2.1	−5.4	+2.2	3.2	−3.0	−5.8	−0.1
2,000	−0.8	−1.8	−4.2	+1.2	−0.6	−1.7	−7.0	+2.1	1.6	−3.0	−7.2	−0.5
2,500	−3.2	−1.8	−6.8	+0.8	−2.9	−2.1	−9.5	+1.8	−0.2	−2.6	−9.9	−1.2
3,000	−5.6	−1.8	−9.8	+0.3	−5.5	−2.4	−12.4	+1.6	−2.6	−2.7	−11.9	−0.8
3,500	−8.3	−2.0	−13.1	−0.5	−8.1	−2.5	−15.1	+1.7	−6.3	−3.6	−14.4	−0.6
4,000	−11.1	−2.0	−16.7	−1.3	−11.7	−2.7	−18.5	+0.9	−9.9	−4.4	−15.5	−0.4
4,500	−13.2	−1.4	−18.8	−0.4			−22.4	−0.2	−11.2	−2.9		
5,000			−21.2	+0.3								

RELATIVE HUMIDITY %

Surface	71	0	79	−3	73	+4	80	−2	79	+1	73	−6
250	71	0			72	+4			77	+1	73	−6
500	66	+1	77	−2	64	+1	79	−1	73	+1	72	−2
750	61	+1	71	−1	62	+2	74	+1	69	+1	70	+1
1,000	58	+3	64	−2	59	+1	70	+4	65	+2	68	+4
1,250	54	+3	60	−2	54	−2	67	+6	63	+4	66	+7
1,500	50	+3	59	0	46	−7	64	+5	61	+6	59	+4
2,000	45	+3	54	−3	40	−8	60	+2	52	+3	51	+1
2,500	43	+2	52	−4	34	−9	61	+3	42	−4	50	−1
3,000	42	+1	53	−3	32	−9	62	+4	34	−8	52	0
3,500	41	0	50	−4	33	−8	64	+8	32	−8	56	0
4,000	41	−1	48	−5	59	+14	68	+13	32	−6	86	+30
4,500	28	−13	48	−5			72	+13	30	−7		
5,000			48	−6								

VAPOR PRESSURE (*mb.*)

Surface	5.45	−0.44	3.88	+0.51	6.44	−0.43	2.92	+0.48	8.18	−0.52	3.82	−0.06
250	5.42	−0.43			6.32	−0.46			7.88	−0.49	3.77	−0.02
500	4.95	−0.29	3.64	+0.42	5.51	−0.62	2.86	+0.46	7.28	−0.46	3.37	+0.05
750	4.48	−0.27	3.38	+0.43	5.03	−0.70	2.80	+0.54	6.68	−0.52	3.23	+0.19
1,000	4.02	−0.25	3.25	+0.45	4.45	−0.88	2.77	+0.56	6.15	−0.41	3.01	+0.21
1,250	3.49	−0.35	3.02	+0.37	3.76	−1.07	2.71	+0.57	5.53	−0.40	2.85	+0.29
1,500	3.04	−0.37	2.82	+0.33	2.84	−1.42	2.55	+0.53	4.94	−0.38	2.51	+0.19
2,000	2.51	−0.26	2.34	+0.17	2.49	−0.97	2.11	+0.36	3.58	−0.65	1.90	+0.01
2,500	2.04	−0.27	1.88	+0.07	1.62	−0.98	1.76	+0.33	2.27	−1.13	1.58	−0.05
3,000	1.69	−0.28	1.60	+0.09	1.25	−0.83	1.43	+0.32	1.30	−1.39	1.39	−0.03
3,500	1.37	−0.32	1.16	−0.05	1.14	−0.64	1.17	+0.38	0.84	−1.34	1.28	+0.01
4,000	1.14	−0.32	0.98	+0.02	1.85	+0.21	0.97	+0.41	0.76	−1.04	1.92	+0.87
4,500	0.55	−0.62	0.94	+0.15			0.76	+0.19	0.65	−0.90		
5,000			0.90	+0.23								

TABLE 2.—*Free-air resultant winds (m. p. s.) during January, 1926*

Altitude m. s. l.	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		8-year mean		Mean		11-year mean		Mean		5-year mean		Mean		9-year mean		Mean		8-year mean		Mean		8-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Meters																								
Surface	S. 51°W.	2.6	S. 45°W.	1.2	S. 83°W.	1.9	W.	1.5	S. 83°W.	2.2	N. 79°W.	1.1	N. 59°W.	3.9	N. 59°W.	2.9	N. 42°W.	1.6	N. 38°W.	0.6	S. 65°W.	2.8	S. 53°W.	2.0
250	S. 50°W.	2.6	S. 37°W.	1.3					S. 84°W.	2.5	N. 81°W.	1.3					N. 57°W.	1.7	N. 64°W.	0.6	S. 60°W.	3.3	S. 49°W.	2.5
500	S. 45°W.	4.1	S. 32°W.	2.4	S. 87°W.	3.5	N. 85°W.	2.5	S. 78°W.	4.3	S. 88°W.	2.6	N. 63°W.	4.6	N. 65°W.	3.3	N. 88°W.	2.5	S. 62°W.	1.5	S. 67°W.	7.6	S. 60°W.	5.1
750	S. 58°W.	4.6	S. 41°W.	3.2	N. 69°W.	5.5	N. 78°W.	4.3	S. 78°W.	6.3	S. 82°W.	4.2	N. 51°W.	7.1	N. 65°W.	5.3	S. 68°W.	2.9	S. 61°W.	2.5	S. 75°W.	8.5	S. 67°W.	6.6
1,000	S. 81°W.	5.2	S. 37°W.	5.6	N. 66°W.	7.3	N. 77°W.	5.7	S. 86°W.	7.5	S. 81°W.	5.5	N. 52°W.	8.5	N. 62°W.	6.5	S. 72°W.	3.6	S. 64°W.	3.4	S. 84°W.	8.5	S. 75°W.	7.6
1,250	S. 77°W.	7.0	S. 70°W.	4.2	N. 60°W.	9.4	N. 75°W.	7.0	S. 87°W.	11.3	S. 89°W.	7.7	N. 53°W.	9.2	N. 63°W.	7.5	S. 78°W.	4.3	S. 71°W.	4.6	S. 87°W.	7.0	S. 80°W.	8.6
1,500	S. 85°W.	7.7	S. 70°W.	5.4	N. 61°W.	10.0	N. 73°W.	7.9	N. 88°W.	16.5	S. 87°W.	10.2	N. 56°W.	9.1	N. 64°W.	8.0	S. 82°W.	4.9	S. 74°W.	5.8	S. 87°W.	10.4	S. 83°W.	10.0
2,000	W.	9.2	S. 81°W.	7.4	N. 68°W.	11.7	N. 74°W.	10.5	S. 85°W.	18.1	S. 88°W.	12.9	N. 59°W.	11.8	N. 65°W.	10.6	S. 86°W.	5.7	S. 79°W.	7.3	N. 84°W.	11.7	S. 84°W.	11.8
2,500	N. 82°W.	10.5	S. 85°W.	8.7	N. 74°W.	13.7	N. 80°W.	12.7	S. 84°W.	21.5	S. 89°W.	15.9	N. 71°W.	13.1	N. 67°W.	12.8	S. 87°W.	8.3	S. 80°W.	8.8	N. 84°W.	12.6	S. 89°W.	13.4
3,000	N. 82°W.	11.7	N. 88°W.	10.0	N. 68°W.	16.3	N. 79°W.	14.2	S. 85°W.	19.7	S. 87°W.	16.8	N. 70°W.	15.8	N. 69°W.	14.2	S. 87°W.	11.8	S. 80°W.	10.3	N. 76°W.	11.5	S. 89°W.	13.6
3,500	N. 82°W.	12.2	N. 84°W.	10.5	N. 66°W.	18.2	N. 80°W.	15.5	N. 79°W.	21.8	S. 85°W.	16.8	N. 64°W.	15.8	N. 67°W.	15.4	S. 86°W.	11.5	S. 82°W.	11.4	N. 86°W.	9.9	S. 81°W.	12.7
4,000	N. 72°W.	12.7	N. 85°W.	11.3	N. 60°W.	16.3	N. 85°W.	17.0	S. 68°W.	----	S. 82°W.	16.1	N. 79°W.	15.3	N. 61°W.	16.7	S. 68°W.	11.1	S. 73°W.	12.3	S. 68°W.	23.2	S. 74°W.	16.6
4,500	N. 67°W.	15.7	N. 88°W.	11.0	N. 67°W.	17.1	N. 79°W.	17.6	S. 68°W.	----	N. 82°W.	15.4	N. 80°W.	18.3	N. 58°W.	18.6	S. 68°W.	15.1	S. 74°W.	14.2				
5,000	N. 68°W.	12.7	N. 83°W.	10.8	W.	18.0	N. 80°W.	17.7																

TABLE 3.—*Mean free-air temperatures, relative humidities, vapor pressures, and resultant winds (m. p. s.) during January, 1926, at Washington, D. C.*

Altitude m. s. l.	Naval air station (7 meters)			Weather Bureau (34 meters)—	
Wind	Temperature	Relative humidity	Vapor pressure	Wind	
Meters	(° C.)	(*Per cent*)	(*mb.*)	*Direction*	*Velocity m. p. s.*
Surface	−3.1	77	3.79	N. 55° W.	1.6
250	−1.8	71	3.91	N. 72° W.	4.2
500	−1.6	65	3.77	N. 74° W.	6.6
750	−1.7	63	3.70	N. 72° W.	8.1
1,000	−2.2	62	3.49	N. 77° W.	8.5
1,250	−3.0	62	3.25		
1,500	−3.5	60	3.02	N. 70° W.	11.6
2,000	−4.7	58	2.70	N. 73° W.	12.5
2,500	−6.5	54	2.25	N. 69° W.	15.7
3,000	−8.9	57	2.10	N. 84° W.	18.5

THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

PRESSURE AND WINDS

Probably the most notable fact concerning the weather of January, 1926, was the general absence of particularly unfavorable or unpleasant weather. As in the preceding month atmospheric pressure was high over the Plateau and Pacific coast sections and no storms moved inland from the North Pacific States until near the end of the month, and again as in December this high-pressure area was mainly a local phenomenon and lacked the cold conditions usually attending such high pressure when augmented through anticyclones moving into that region from the Canadian Northwest.

Over central and eastern districts cyclonic disturbances were comparatively infrequent and of rather mild character, though they brought generally heavy precipitation over some southeastern districts.

The first important cyclone developed over the far Southwest about the 1st and moved slowly toward the Great Lakes attended by scattered and generally light precipitation over the southern mountains and Great Plains, but becoming heavier toward the Mississippi Valley and portions of the Gulf States. This storm gave precipitation over a wide area, though it lacked any marked severity until reaching the St. Lawrence Valley where pressure became unusually low, and it passed eastward into the ocean as a severe storm.

A slight barometric depression that first appeared in the east Gulf on the 7th and had moved to the Georgia coast by the morning of the 8th was attended by heavy rains over the Southeastern States and by more or less precipitation as it moved northward near the coast during the following day or two.

Several unimportant low areas, mostly forming near the Great Lakes, gave light precipitation in that region from the 10th to 15th. About the latter date another disturbance formed in the Southwest and by the 17th it was central over Arkansas and heavy rain was falling over portions of the West Gulf States and lower Mississippi Valley. As this storm moved northeastward toward the lower Lakes heavy rains occurred over portions of the Ohio Valley and east Gulf States, continuing during the following day into the Northeastern States.

A rather unusual storm formed in the middle plateau about the 17th and moved slowly southeastward to the south Texas coast by the morning of the 21st, whence it moved with great rapidity and markedly increased severity to the Canadian Maritime Provinces during the following 24 hours, attended by heavy rains in the Ohio Valley and some other districts and by more or less snow in the lower Lake region and to the eastward and northeastward.

During the remainder of the last decade no important storms visited the eastern two-thirds of the country though some heavy rains occurred near the end over the Southeastern States, particularly in southern Florida where locally some of the heaviest rains ever known in January occurred.

The last few days of the month were notable for the breaking up of the pressure distribution that had prevailed for a long period over the far West and Northwest. The high pressure area over the plateau and Pacific Coast States began to disintegrate and by the 29th a low pressure area appeared off the North Pacific coast and rain had set in from central California northward, and during the following few days more or less rain or snow occurred over much of the plateau and Pacific coast area, some heavy rains occurring at the lower elevations of California and considerable snow falling in the mountains, relieving a severe drought and improving the outlook for a substantial water supply.

No important anticyclones moved into the United States from the Canadian Northwest during the first two decades, though one of moderate intensity at the beginning of the last decade brought sharp changes of temperature from the Great Plains region eastward, the weather continuing cold in the Southern States for several days, particularly in Texas, where on the 24th and 25th freezing occurred to the extreme southern part of the State. During the remainder of the decade several anticyclones of only moderate intensity moved eastward along the northern border from the Dakotas to New England, causing sharp temperature changes over the northern districts, and about the 29th the coldest weather of the month occurred over some Middle Atlantic and Northeastern States.

From the Rocky Mountains westward the average pressure was above normal, the maximum occurring over the northern plateau. The eastern two-thirds of the United States and the greater part of Canada had pressure averages less than normal, the greatest deficiencies occurring along the northern border from the Dakotas to New England.

The winds were mainly from northerly points in the Gulf States and southern plains and from the south or southwest over the Atlantic Coast States, the Ohio and middle Mississippi Valleys, the central plains, and Lake region. Elsewhere they were variable.

In the main there were few severe storms save along the North Atlantic coast. Over the North Pacific coast, where January is usually a stormy month, high winds were noted in only a few instances. A table showing the important facts concerning the more severe storms of the month appears at the end of this section.

TEMPERATURE

The month was remarkably free from severe cold and no low-temperature records were broken, though it was quite cold in southern Florida on the 12th and again on the 15th. On the latter date temperatures as low as 24° were reported from points in the trucking districts of the Everglades, where practically all tender vegetation was destroyed. Again from the 20th to 25th the temperatures were low over the west Gulf States, freezing weather